MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

MAX2053 – 3D SIMULATION

(All sections / Groups)

21 OCTOBER 2017
9.00 a.m. - 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 16 pages of simulated questions. Read them carefully.

2. This exam paper consists of TWO parts:
   Part One: Multiple Choices Answer **ALL 30** questions
   Part Two: Essay Questions Answer **TWO** out of FOUR

3. Simulate all your answers in the Answer Booklet. May the force be with you.

PART ONE: MULTIPLE CHOICE QUESTIONS

Answer ALL Questions in the Multiple Choice Answer Sheet.

1. Below are statements regarding Paint Effects uses in MAYA. Which of following is **TRUE**?

   A. The Global Scale attribute is used to adjust the overall scale of the effect.
   B. Paint Effects is a particle based effects simulation
   C. MAYA Paint Effects can only be rendered using Maya Software.
   D. Paint Effects cannot be converted into Polygon

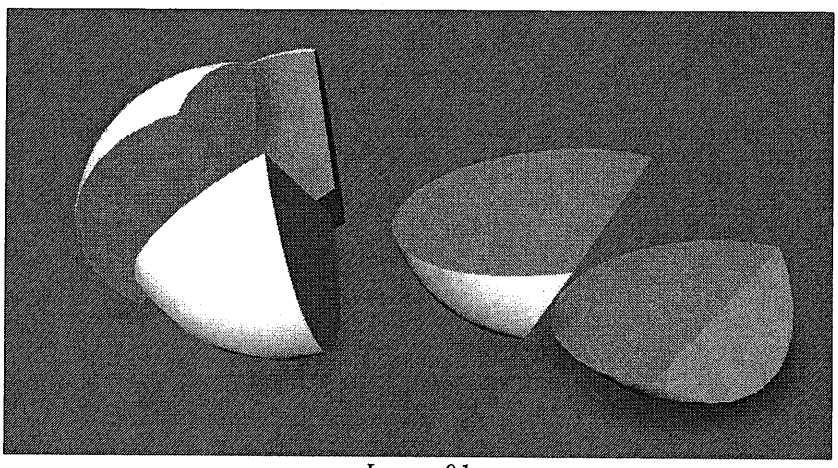

Image 01

2. *Image 01* above shows a simple effect of a ball shattering after hitting the floor. Which type of shatter effects and simulation system should you use to quickly accomplish this effect?

   A. Crack Shatter with Bullet Simulation
   B. Surface Shatter with Rigid Body Simulation
   C. Solid Shatter with Bullet Simulation
   D. Object Shatter with Rigid Body Simulation

3. Which fields listed below are **NOT** used in any MAYA dynamic simulations?

   A. Turbulence
   B. Goal
   C. Drag
   D. Volume Axis

Continued...

4. Which attribute sets how much a moving rigid body resists movement against dynamic forces in a rigid body simulation scene?

   A. Mass
   B. Initial Forces
   C. Damping
   D. Dynamic Friction

5. Neymar wants to create a muddy ground effects using soft body dynamics. However the soft body ground does not stop deforming after collision. What can he do to better control the deformation result?

   I. Decrease the conserve value
   II. Decrease the friction value
   III. Increase the resilience value
   IV. Increase the damping value

   A. I and II
   B. I and IV
   C. II and III
   D. III and IV

6. The *'Conserve'* attribute is a very significant element in any dynamic simulation. Which of the following are **FALSE** regarding the Conserve attribute?

   I. Conserve allows MAYA to retain all history of simulation fields that affected the object
   II. Conserve allows an object to regain its speed without external fields affecting the object
   III. Conserve does not affect simulated objects before a collision event
   IV. Conserve does not affect both MAYA rigid body simulation and Bullet simulation that are driven fields

   A. I, II and III
   B. I, II and IV
   C. II, III and IV
   D. All of the above

Continued...

7. Which dynamics simulation systems would an artist use to create a belly jiggling effect on a 3D character model?

   A. Rigid Body Simulation with Springs
   B. Soft Body Simulation with Goals
   C. Soft Body Simulation with Goals and Springs
   D. Soft Body Simulation with Goals and Constraints

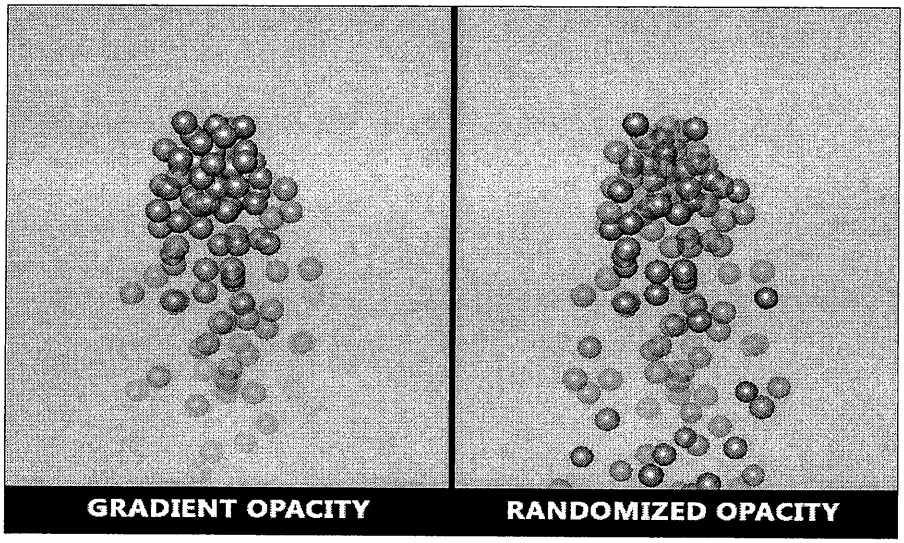

Image 02

8. *Image 02* above shows a simple *nParticle* objects emitted from the same emitter with a black to white ramp assigned to their opacity channel. By default, the *nParticles* will have an opacity effect similar to *'Gradient Opacity'*. What can you do to achieve the *'Randomized Opacity'* effect instead?

   I. Assign the Opacity Scale Input to Randomized ID
   II. Assign a randomizing runtime expression onto the opacity channel
   III. Increase the Lifespan Random attribute
   IV. Create a black and white stripe pattern on the opacity ramp channel with Opacity Scale Input set to Age.

   A. I only
   B. I and II
   C. I, II and III
   D. All of the above

Continued...

9. Enlarging a fluid container would cause the fluid content to look less dense. How would you increase the density of the fluid container?

   A. Increase the Fluid Resolution
   B. Increase the Voxel Resolution
   C. Increase the Threshold Resolution
   D. Increase the Viscosity Resolution

10. What is the best workflow when using *nCloth* simulation for your 3D character project?

    I. Constraint the *nCloth* clothing to itself and its character
    II. Make the connections between your *nCloth* and collision objects
    III. Create character's clothing *nCloth*
    IV. Adjust *nCloth* properties to simulate

    A. III > II > IV > I
    B. III > IV > II > I
    C. III > I > IV > II
    D. III > II > I > IV

11. Jepp wants to create hundreds of random wedding photographs flying through a 3D scene. What is the **FASTEST** method for him to execute this effect?

    A. Create a suitable curve and emit from object along the curve's path
    B. Create a suitable curve flow and attach a Particle Instance of photographs textured 3D cards
    C. Create a suitable curve flow and attach sprites of the photographs
    D. Create an emitter with sprites and use necessary Fields to control the movement of the particles around the 3D scene

12. Catherine wants to attach a new *ParticleShape* with an existing drag field. Which MAYA editor would she use to complete the task?

    A. Fields Connection Editor
    B. Dynamics Relationship Editor
    C. Dynamics Component Editor
    D. Dynamics Fields Editor

Continued...

13. Which options below can be used to alter the duration of a particle's lifespan?

I. Add opacity > Opacity Per Object
II. Emission Attribute > Max Count
III. Lifespan Mode > Random Range
IV. Per Particle Array > Lifespan PP

A. I, II and III
B. I, III and IV
C. II, III and IV
D. All of the above

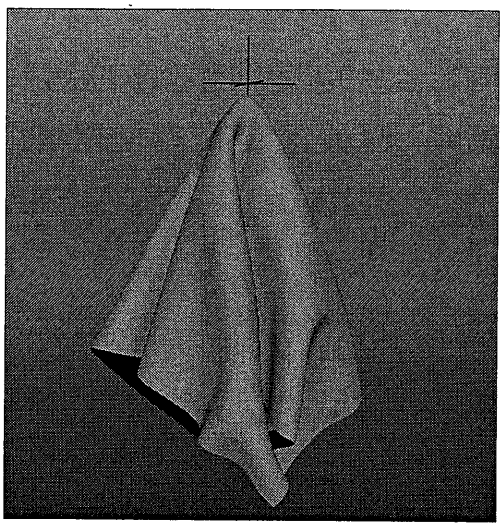

Image03

14. *Image 03* above shows an nCloth 3D plane constrained to a locator. Which nCloth constraint would be best to use to achieve this effect?

A. Component Constraint
B. Transform Constraint
C. Point to Surface Constraint
D. Location Constraint

15. What is a *Voxel* in the context of Fluid Simulation?

A. Particle radius inside a Fluid container
B. Subdivision grid of a Fluid container
C. Pixel depth of a Fluid container
D. Turbulence attribute of a Fluid container

Continued...

16. One of the biggest advantage of *Bullet* simulation over MAYA *Rigid Body* is its capability to handle denser and more complex collision scene. What additions added into *Bullet* that gives it this advantage?

I. Gravity field in the solver
II. Initially Sleeping option
III. Efficient Collider Shape stand-in objects
IV. Glue constraint attribute

A. I, II and III
B. I, II and IV
C. II, III and IV
D. All of the above

17. Which statement below is **TRUE** regarding MAYA *Ocean* effects?

A. It creates full realistic 3D surface water deformation
B. It does not require real-time computer calculation to simulate
C. It can interact with MAYA fields and collision object
D. It is a flat NURBS surface with an *Ocean* shader

18. How do you bake a rigid body simulation?

A. Go to Solvers > Timeline > Bake Simulation
B. Go to *nCache* > Frame > Bake Simulation
C. Go to Edit > Keys > Bake Simulation
D. Go to Modify > Attributes > Bake Simulation

19. Which types of curves below are acceptable for use as a guide hair for *nHair* simulation scenes?

I. CV NURBS curve
II. EP NURBS curve
III. Open NURBS curve
IV. Closed NURBS curve

A. I and II only
B. II and IV only
C. All of the above
D. None of the above

Continued...

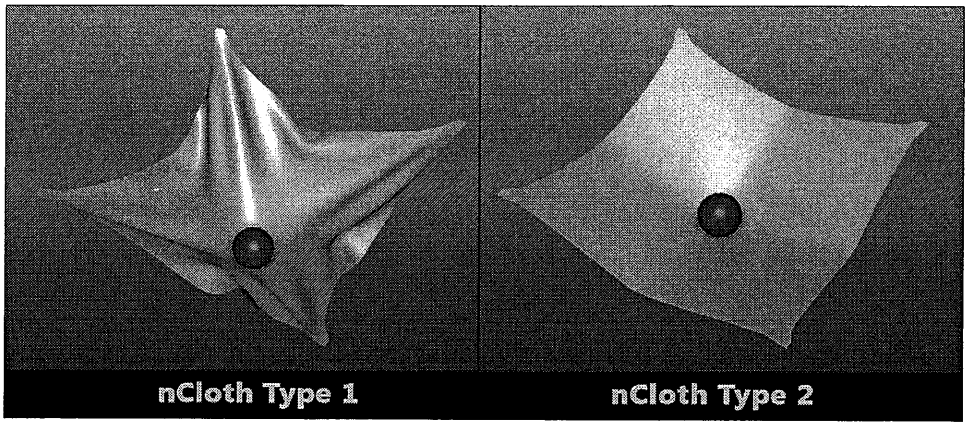

Image 04

20. *Image 04* above shows two different *nCloth* simulation interacting with an iron ball. What should you do to achieve a rigid cloth simulation similar to *nCloth Type 2*?

    A. Increase Stretch Resistance & Bend Resistance
    B. Decrease Compression Resistance & Bend Angle
    C. Increase cloth's Mass and Restitution Angle
    D. Decrease Bend Drop-off & Shear Resistance

21. DiCaprio has created a scene of a rigid body totem turning on the Y-axis. He wanted the totem to continuously spin without ever stopping. How can he achieve this using the rigid body dynamic systems?

    A. Assign a value to the Torque Impulse attribute
    B. Assign a value to the Rotate-Y attribute
    C. Decrease the angular damping attribute
    D. Increase the conserve value

22. Luke is trying to simulate a lot of bricks to break and fall onto the ground using *Bullet* in MAYA. However, selecting each rock pieces to tweak their attributes is hindering his speed and productivity. What is the **BEST** solution for him to improve his *Bullet* workflow?

    A. Create a set driven key on a single rock to automate selection for all rock
    B. Create a Rigid Sets to control all rock simulation attributes
    C. Parent all the rocks into one group and apply *Bullet* simulation onto the group
    D. Create multiple selection handles to group the rocks together

Continued...

23. Which statement regarding *Particle Cloud* Shader below is **TRUE**?

A. The Particle Cloud Shader cannot be used with Sprites particle type
B. The Particle Cloud Shader is the only volumetric shader in MAYA
C. The Particle Cloud Shader can only be rendered using software renderer
D. The Particle Cloud Shader cannot cast self-shadows onto itself

24. Rebecca is simulating a *nCloth* dress but is having difficulties getting the cloth to stop penetrating during simulation. What can she do to stop the penetration issue?

I. Increase the number of collision iterations
II. Increase the number of substeps
III. Increase the collision thickness of the *nCloth*
IV. Increase the push-out value of the *nCloth*

A. I, II, and IV
B. I, III and IV
C. II, III and IV
D. All of the above

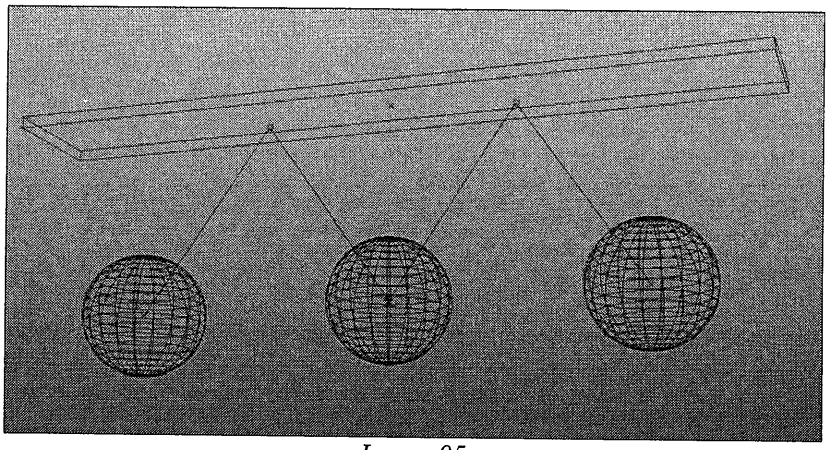

Image 05

25. *Image 05* displays a rigid body constraint used in MAYA. Which constraint is this?

A. Hinge Constraint
B. Nails Constraint
C. Multi Constraint
D. Pin Constraint

Continued...

*"You need to increase the emitter **rate** to 50000!!!"*

-Ayman

26. The amount of particles emitted from an emitter depends on its *rate* value. What does the statement above translate to?

    A. Increase 50000 particles emitted per cycle
    B. Increase 50000 particles emitted per frame
    C. Increase 50000 particles emitted per second
    D. Increase 50000 particles emitted per lifespan

27. Derek is tasked to create small sparks effect emitting automatically from collision points of a fireball hitting the wall. Which tool is the **BEST** for her to create this effect?

    A. Make Collide with Particle Collision Event Editor
    B. Make Collide with Particle Instancer
    C. Position new emitters on the wall and animate the rate value
    D. Draw particles with the Particle Tool and move using the Uniform field

28. Everytime an artist creates a dynamic curve using *nHair*, three new curves will be added to assist the simulation process. Which of the following curves is not created for a *nHair* simulation.

    A. Shape Curve
    B. Start Curve
    C. Current Curve
    D. Rest Curve

29. Freeza is adding a new water droplet effect using *nParticle* into an existing *nCloth* shirt simulation. He wanted the water droplet to collide and trickle down along the shirt. However, he could not get the water droplet to interact with the shirt. What must he do to solve this problem?

    A. Ensure that the *'Collision Layer'* for both *nDynamic* object is the same
    B. Ensure that the new *nParticle* is assigned to the *nCloth* nucleus
    C. Ensure that the new *nParticle* 'Collision Tolerance' is set to high
    D. Ensure that the *nCloth* is a Passive Collider object

Continued...

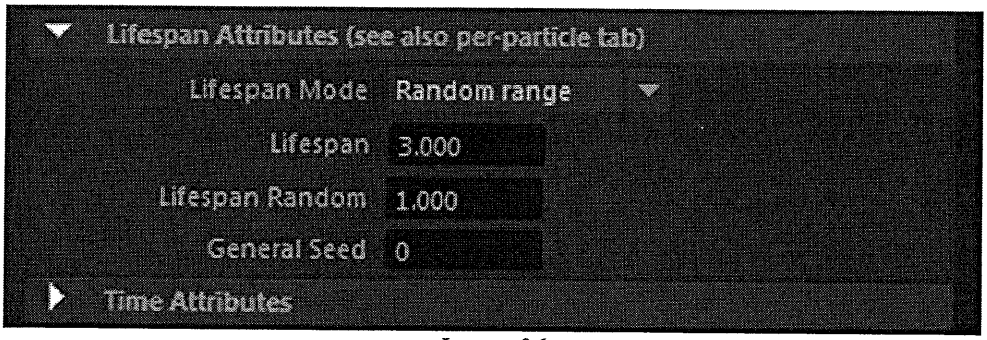

Image 06

30. Ronald Crumb created a new *ParticleShape* with lifespan settings shown in image above for a PAL TV production. Based on these settings, which statements below are **TRUE**?

I. Increasing '*General Seed*' will reduce lifespan's randomization
II. All particles has a lifespan life of 3 seconds
III. Particles will begin to die after the 50th frame
IV. Increasing '*Lifespan Random*' value will improve randomization results.

A. I and II
B. II and III
C. II and IV
D. III and IV

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PART TWO: SUBJECTIVE QUESTIONS

Answer **TWO** of the following Four Questions. Give **DIRECT** answers.

Question 1

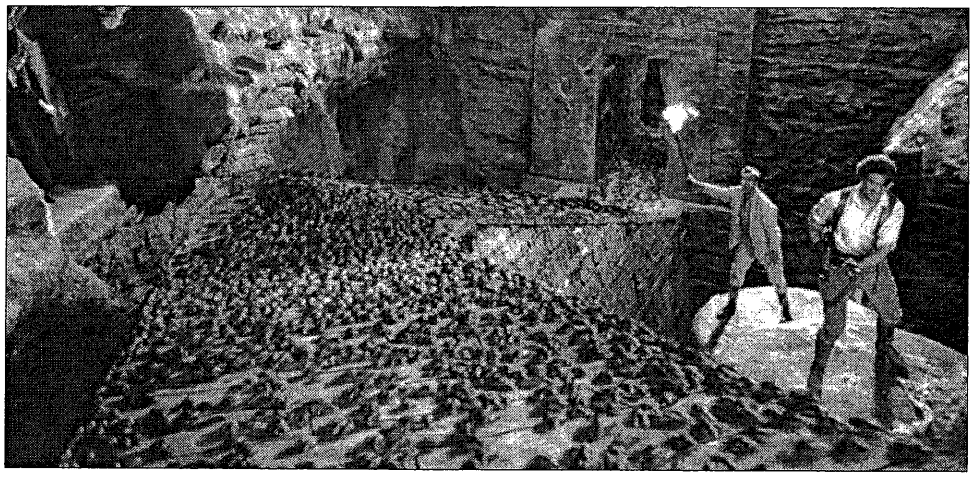


Image 07

I. *Image 07* above was taken from **'The Mummy'**. The scene depicts a swarm of scarab beetles crawling on the floor. The scarabs are animated 3D objects and they move organically along the floor. Please explain in detail the necessary steps needed to re-create this scene using particles simulation. Use point forms to ensure clarity of steps.

example:

STEP 1: Create a 3D model of a scarab beetle.
STEP 2: .....
.
..
STEP *n*: ....
FINAL STEP: Render scene

(16 marks)

II. The *'Space Scale'* attribute is a very important attribute in any *nDynamic* simulated scene. What is the function of the *'Space Scale'* attribute and why do you need to adjust it in order to achieve believable simulation result.

(*4 marks*)

Continued...

Question 2

I. What is Soft Body Simulation and how does it differ from Rigid Body Simulation?

(*4 marks*)

II. Explain the difference between a soft body object that has a *'Make Soft'* setting compared to a soft body object with *'Make Duplicate Soft with Goal'*? Give **TWO** examples of effects that can be done for each type of soft body setting.

(*8 marks*)

III. What are the advantages and disadvantages of using *Soft Body Simulation* versus *Jiggle Deformers* to create secondary body movement effects in 3D character animated scene? Please recreate *Table 01* in your answer booklet.

	Advantages	Disadvantages
Soft Body		
Jiggle Deformer		

Table 01

(*8 marks*)

Continued...

Question 3

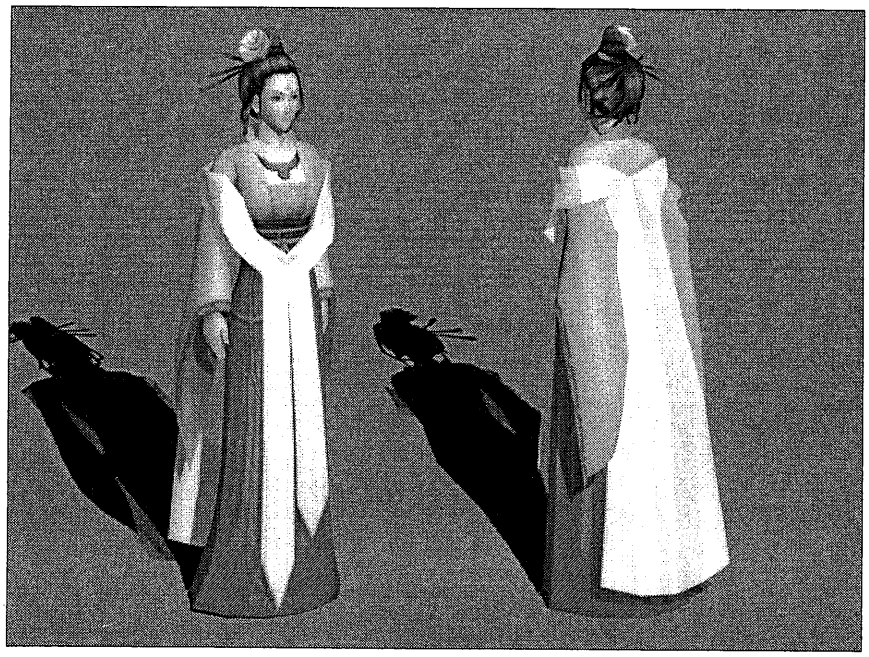


Image 08

I. *Image 08* above is an example of a complex clothing design for effects artist to simulate. Based on this design, explain **BRIEFLY** the necessary *nCloth* simulation techniques you can do to ensure a *smooth, fast and accurate* cloth simulation.

(14 marks)

II. Explain **BRIEFLY** what *'Attract To Matching Mesh'* constraint is and how it can be used effectively in a character cloth animation setup?

(3 marks)

III. Give **THREE NON-CLOTHING** examples of real-life effects that could be created using *nCloth.*

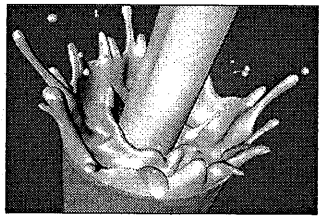
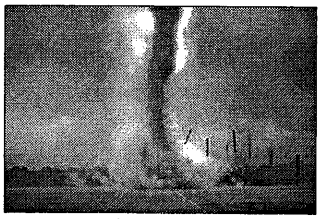
(3 marks)

Continued...

Question 4

I. Please provide **THREE** productivity methods to improve efficiency in any dynamic simulation process. Discuss briefly the reasoning behind those methods? *(6 marks)*

II. Fill up the table below with the **BEST EFFICIENT** answers. Please recreate *Table 02* in your answer booklet and omit the first example from your answers.

Effects	Dynamics System used	Key technique(s) used
Wall break (example)	Rigid Body or Bullet Simulation *(example)*	Shatter tool, Active & Passive Body, Gravity field. *(example)*
 *Liquid Splash*		
 *Realistic Tornado*		
1000 Flying Lanterns		

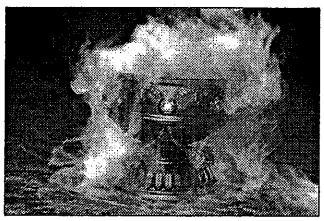
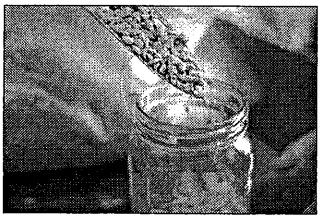
'Soul Stealing' effect		
 *Soft vapour*		
Fire on character body		
 *Grains filling up a jar*		

Table 02

(14 marks)

**Please check, re-check and triple-check your answers until the exam ends*

End of Page.